

A ROLE FOR THE GOVERNMENT IN PETROLEUM FUEL R&D

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Deriving a national benefit from petroleum fuel involves many steps:

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| ● Finding the resource | - Exploration |
| ● Getting it out of the ground | - Production |
| ● Bringing it to the refinery | - Transportation |
| ● Converting it to useful products | - Refining |
| ● Delivering it to the customer | - Marketing |
| ● Burning it in suitable equipment | - Utilization |

as well as the setting of standards that protect the national welfare. The overall role of petroleum fuel R&D is to provide better ways to carry out all these steps--where "better" means cheaper, safer, cleaner, more efficient, more convenient, more timely or any other positive comparative.

Who should control this R&D?

Obviously those who can do it in the best, that is in the cheapest, safest, cleanest, most efficient, most convenient, most timely manner.

In this country, we have basically four choices:

- The Government
- The Universities
- Non-profit Institutes
- Private Industry

and each of these four has its particular areas of expertise, activities in which it is "best." So we really need all four and our present goal must be to suggest a way in which to carve up the R&D function to assure that the overall result is optimal for the country.

Retrospectively, our private and highly competitive industry has funded, performed and controlled by far the greatest part of petroleum fuel R&D--with a very able assist from the Universities in the basic research area. Private industry has carried the ball and has carried it well. U.S. technology for all the steps involved--from exploration through refining to utilization--tends to be the model that other nations strive to emulate.

That has been the picture in the past.

What of the future?

A different factor is affecting the desire for new technology, a factor that does not necessarily make itself felt through the marketplace, a factor that does not elicit a prompt R&D response from private industry: the factor of national security.

To the extent that national security considerations override commercial driving forces, to that extent governmental intervention in petroleum fuel R&D is not only warranted but required. Thus if production of otherwise commercially unattractive resources such as shale oil or coal liquids is considered to be a national requirement, Government involvement in developing the requisite technology is called for. The ideal role here, as we see it, is a cooperative one where the Government and the private sector combine to fund and to control the R&D.

But what of the other steps--the steps beyond production? Transportation, refining, marketing and utilization of fuel products from synthetic feeds like shale oil and coal liquids will differ from these same operations using "normal" crude oils. Here we see no need for Government involvement in developing new technology. Private competitive industry has amply illustrated that it can well handle such a change in feedstocks. The driving forces to make, market and use the products will remain the same. We believe that it would be unwise to change a competitive innovation system that has worked well in the past if there is no change in the driving forces.

Similar reasoning applies wherever any societal factor overrides "normal" market forces: government intervention in R&D should parallel government intervention thru other mechanisms (penalties, grants, subsidies, tax-relief or whatever) to facilitate initiating the desired change. Once the new incentives and new criteria exist, the private sector is best able to uncover the technology needed to optimize meeting the perceived societal goals.

Of course, we also see other roles that the Government can and should play in indirect support of the development of new petroleum fuel technology.

First, is an obligation to help in the development of a pool of well-trained technical professional personnel. This is a national need. The best way to train good technical people is still to have them participate in good research and the Universities can hardly be expected to find adequate financing for meaningful research programs on their own.

The Government is also well placed to undertake large-scale basic research programs which the universities cannot afford and to build special facilities that can be shared by a number of organizations.

Basically, the role of all R&D is to find better ways of doing things and the Government's "things" have been well defined for us:

- To establish justice
- To ensure domestic tranquility
- To provide for the common defense
- To promote the general welfare
- To secure the blessings of liberty to ourselves and our posterity.

The appropriateness of any proposed Governmental R&D should be tested against those objectives.